

ABSTRACT

The ionization device of the present invention is intended for use in conjunction with an aerosol TOF MS operating in a continuous mode and is capable of ionizing particulated substances in a wide range of particle masses. In the illustrated embodiment, the ionization unit consists of three coaxial cylindrical bodies having a three aligned longitudinal slits for directing electron beams from externally located electron gun onto the axially arranged flow of droplets. The cylindrical bodies are connected to voltage sources so that the external cylindrical body functions as an anode that extracts electrons from the current-heated filament. The central cylindrical body, in combination with the aforementioned anode, serves as an electron-energy control member for precisely controlling and selecting the energy of electrons that reach the flow of particles, while the inner cylindrical body functions as a decelerating member that can be used for adjusting energy of electrons which reached the flow of particles. The heated filament of each electron gun, which is used as a source of electrons, is inclined with respect to the aforementioned longitudinal axis whereby modulation applied to the elongated outer electrode of the electron gun provides different ionization conditions for specific particles of predetermined masses for analysis of which the aerosol TOF MS is tuned.